

Claimed is:

1. A method for monitoring cracks in a silica structure comprising:  
sensing a wave signature of a crack in the silica structure.
2. The crack monitoring method of claim 1, wherein the structure comprises sol-gel.
3. The crack monitoring method of claim 1, wherein the structure comprises a tubular configuration.
4. The crack monitoring method of claim 1, wherein the wave signature is characterized by the presence of electromagnetic energy.
5. The crack monitoring method of claim 1, wherein the wave signature is characterized by the presence of acoustic energy.
6. The crack monitoring method of claim 5 wherein the step of sensing comprises detecting acoustic energy by a contact detection system.
7. The crack monitoring method of claim 5 wherein the step of sensing comprises detecting acoustic energy by a non-contact detection system.
8. The crack monitoring method of claim 5 wherein the step of sensing comprises detecting acoustic energy by a combination of a non-contact detection system and a contact detection system.
9. The crack monitoring method of claim 1, wherein the step of sensing comprises detecting emissions characterized by the wave signature.
10. The crack monitoring method of claim 1, wherein the step of sensing comprises detecting reflected signals characterized by the wave signature.
11. The crack monitoring method of claim 10, wherein detecting reflections is performed by Doppler radar.

12. The crack monitoring method of claim 1 wherein the wave signature is transmitted from a sensor to a computer by a wireless data transmission system.

- ~~13.~~ A device for monitoring cracks in a silica structure comprising:  
a sensor for sensing a wave signature of a crack in a silica structure.
14. The device of claim 13, wherein the silica structure comprises a sol-gel.
15. The device of claim 13 wherein the silica structure comprises a tubular configuration.
16. The device of claim 13, further comprising:  
a wireless data transmission system for transmitting wave signature sensing information from the sensor to a computer.
17. The device of claim 13, wherein the sensor is a passive device.
18. The device of claim 17, wherein the sensor is a piezoelectric device.
19. The device of claim 13, wherein the passive device is a microphone.
20. The device of claim 13, wherein the sensor is an active device.
21. The device of claim 20, wherein the sensor is a Doppler radar system.
- ~~22.~~ A silica structure fabrication process development method comprising:  
monitoring cracks in the silica structure by sensing a wave signature of a crack in the structure to isolate one or more process steps in which cracking has occurred;  
adjusting process parameters in the one or more isolated steps to diminish or eliminate cracking.